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THE NEED FOR AN EXAMINATION OF CERTAIN HYPOTHESES IN MENTAL TESTS.

RELATIVE to the time and number of people devoted to work with mental tests, the results have been astonishingly meager in theoretical value. Not only do investigators in the field of mental tests fail to find generalizations of interpretative value in their own material, but writers who are eagerly searching for data and relations worth speculating about are given scant reward for any perusal of the voluminous literature of mental tests. In view of the unproductiveness of the field in propositions of fundamental significance, it seems worth while to examine the situation to discover possible causes that may explain the failure. We must look for such causes in conditions basic to the field since it is not likely that any superficial errors would bring about what from a theoretical point of view is great waste of scientific talent.

The fact that mental tests have some practical value does not account for the lack of contribution to theory, in fact one might suppose that the increasingly general use of tests in concrete situations where the result really makes a difference would make the development of sound theory immediate and necessary. Yet one finds but little evidence that such stimulus of the theoretical by the practical is taking place. It seems to me quite contrary to our experience of the nature of the interaction of pure and applied science to think that the practical usefulness of tests is limiting their possibility for theoretical contribution.

I venture this explanation. Extensive collection of data through mental tests began without the necessary antecedent and contemporaneous development of point of view, hammering out of contradictions in concepts and hypotheses, and elimination of ambiguities in common everyday words and ideas. There has meanwhile grown up a habit of thinking about intelligence and ability which is founded, not upon manifestations of intelligence as we commonly experience them, but upon derivative facts which are the results of measurement by mental tests. These derivative facts are subject to fundamental bias due to the nature of the terms in which the results of

mental test performances have been expressed and due to the type of analysis which our limited and frequently misused statistical technique makes possible. A further complication arises through a willingness to accept statistical hypotheses as applied to intelligence simply to have statistical technique available for use. Now these habits of thinking which have been grounded on misleading derivative facts are the intellectual equipment which has been available in the analysis of further derivative facts. Naturally, it has been impossible to arrive at propositions of theoretical importance, the tool of criticism being of the same substance and no more finely tempered than the material to which it has been applied. The piling up of data has therefore been of little advantage, in fact it has created a wilderness of tangled issues of trifling importance removing still further the possibility of theoretical evaluation and interpretation.

In order to justify this position and to clear up if possible the obscurity of the explanation, let me give some illustrations of the way derivative facts, the test measurements, may mislead. I am afraid I shall have to take some definition of intelligence for the purposes of this paper, but if the reader does not like my definition, he may substitute any he happens to have a fondness for—the propositions I wish to make will hold good, I believe, for any ordinary conception.

Let us take Stern's definition which is generally known and widely accepted in its main implications. "Intelligence is a general capacity of an individual consciously to adjust his thinking to new requirements: it is general mental adaptability to new problems and conditions of life." In spite of the assumptions that are made in putting the term "general" into the definitions, this concept will be useful enough here.

If we can, let us abandon the terms and concepts which mental tests have given us and approach intelligence, this general mental capacity, as an adaptive function with which we are continuously in contact in our ordinary experience. One of our thought habits that we should be likely to question first is that general intelligence, even in quantitative terms, can be expressed as a linear or one-dimensional function. That is, we should question whether of two individuals, Henry and Henrietta, one must of necessity be equal to, greater than, or less than the other in general mental adaptability. It is interesting to see how this thought habit that quantitative intelligence must be a linear intelligence may have arisen. In measuring the performance of an individual in any test, the scale which we use, be it "seconds" or "correct responses," is a linear scale; where it is not a linear scale, as when

time and accuracy are observed, an index is shortly forthcoming which is linear. These measures, in terms of linear scales, become symbolic of the individual's performance, and are in this sense derivative facts introducing the bias of the linear scale into the comparisons of the abilities of various individuals. When the results of several tests are combined, as for example, in the Binet series or the Army Intelligence tests, the standing in the combination is again expressed in terms of a linear scale, not because we have analyzed our concept of and experiences with general intelligence and have found it so expressible, but because our common methods of test measurement and combination preclude any other result.

I am inclined to think that intelligence may best be thought of quantitatively as multi-dimensional, a somewhat different thing from multi-focal; and that general intelligence may be expressed as position in multi-dimensional space. I do not wish to enlarge on this point of view at this time, except to indicate how even though intelligence be multi-dimensional, a linear statement might serve with considerable success for practical purposes as it has done to a very real extent.

In talking about the *size* of individuals we are able to distinguish well enough between large and small men, recognizing that we consider height and weight in making our judgments. If a man be tall and heavy, he is large in size; if he be short and light, he is small in size. If we should combine quantitative measures of height and weight for these two individuals just as we combine the measurements on different tests, we should have *size* expressed on a linear scale in terms that check up well enough with the facts. If, however, a man be tall and light, or if he be short and heavy, and if we should combine these measures, we should find these two men to be "average" in size, a thing which, if anything, they are not. *Size* thus breaks down as a variable that can be measured in linear terms, because quantitatively size is at least two dimensional, and "general size" must be stated as position in two-dimensional space.

The reason we can talk about men being large and men being small, is because of a correlation that exists between height and weight. But we do not deceive ourselves by thinking that size is an objective attribute measurable in linear terms; we never refer to a tall thin man as a man of average size. We have, however, grown into the habit of thinking that general intelligence is expressible linearly, and in my opinion this is due, let me repeat, to the influence of derivative facts in shaping our concepts. General intelligence might better be thought of as position in multi-dimen-

sional space, just as size is considered position in two-dimensional space.

Let us consider a bias of another type. If we were approaching the field without too definite statistical prejudices, I am inclined to think that we should question before we got very far the implications of the assumption of linear regressions between test performance and general intelligence. The assumption is made quite generally and it has affected basically our thinking about the measurement of ability.

It should be stated at this point that evidence of linearity consisting of the regression of test measurements on judged intelligence is ordinarily worthless. The range of ability tested is usually so narrow, or the method of obtaining judgments so prejudices the facts as quantitative measurements that the regressions observed are descriptions of actual conditions at second or third hand at best.

Consider any test you please, it is fairly obvious that for certain ranges, either extremely high or extremely low, differences in intelligence will not be paralleled by differences in test performance. Where we have a fairly objective criterion as age in maturity relations or trade skill in trade test relations, we find gross departures from linearity the rule rather than the exception.

Yet the habit of thinking of these relations in terms of correlation coefficients with the implied assumption of linearity is quite general. It is of course basic to all attempts to combine tests by the partial correlation method, a method that was found quite inapplicable in the preparation of trade tests where the regressions could be studied. Consequently, we are building on the sand as long as the consequences of such an assumption are not critically examined.

One other illustration should serve, though I have no idea that the possibility of such illustrations is exhausted. We should probably not admit that we, as individuals, are of the same general intelligence from time to time if we were very hard pressed on the point. We know pretty definitely that our "general mental adaptability to new problems" varies markedly from time to time and place to place. It varies with what we have eaten and how we have slept, with time of day and character of our immediate associates. For some people this variability is probably greater than for others.

But an assumption of a static intelligence level is necessary to mental test work as it is now conceived. It may work well enough for practical purposes, but it is no basis for speculation. Such an assumption seems based on a certain degree of uniformity as found in testing the same individuals at different times. So much the worse for the tests! If we did not need such an assumption so

badly, we should question at once whether tests giving the same rating from time to time are not extremely insensitive measures of general mental adaptability. This bias is strengthened by the necessity for making such an assumption in order to use the methods of attenuation which have been popular. For although one can make allowances in studying the size of correlation coefficients for errors that are made in measuring a static thing, to make such corrections when the thing measured is unstable and variable is hardly permissible.

In my opinion, the fruitlessness of the mental test field is caused by the persistence of such thought habits as the three I have described. I would not contend that the propositions I have made are true. I only want to show that many fundamental notions that color the whole test field are open to superficial criticism to say the least. The justification found in Stern, that just as electricity is measured without too precise a knowledge of electricity, intelligence can also be measured without a final theoretical groundwork, has carried us too far. We must examine our basic hypotheses, putting aside as far as possible such concepts as we have formed as a result of the study of derivative facts. We must abandon in research that we hope will be of theoretical importance, assumptions and methods which critical analysis shows to be faulty, painful as this procedure may be. It is not my intention to question the very real practical value of mental tests. But the usefulness of mental tests in concrete situations can not increase beyond a certain point unless, along with the activity in the field as an applied science, results of a speculative and interpretative value are secured. It is probable that many of the failures of mental tests can be traced to our present inadequate theoretical foundations.

BEARDSLEY RUML.

THE SCOTT COMPANY LABORATORY.

PROFESSOR STRONG'S THEORY OF "ESSENCE"

I AM in agreement with so many things in the epistemological part of Professor Strong's recent volume, that I hesitate to put myself in the position of a critic. I should prefer to have it understood that I am raising certain questions of interpretation rather, with the design, not so much of establishing a rival point of view, as of clearing up ambiguities in the interests of a common platform. I do not feel clear to what extent, if any, Professor Strong really would disagree with the claims I shall here advance. But I do feel that there are points on which his own pronounce-

ments are not as unequivocal as could be desired; and two of these in particular I should like in what follows to examine.

Professor Strong's theory of knowledge, condensed into a very brief formula, is roughly this: that in knowledge we are, through the instrumentality of a psychical state, affirming the presence, in an object independent of the knowing experience, of an abstract logical essence, this objective essence alone, and neither the object nor the essence's own "givenness" being given, or immediately apprehended. And the first question I want to raise concerns the precise description of this "given essence."

My difficulty centers about the apparently wavering use in Professor Strong's exposition of two or three of his fundamental terms, and, first, of the term "object." At the start he defines explicitly the object as the independent real to which knowledge is directed;[1] and to this usage it seems to me important to keep. For if the essence *also* is an object, we appear, notwithstanding all we may say about its non-existence and its non-psychical character, inevitably tending to think of it as a shadowy image hovering before the mind, and taking the place therefore of the real thing as the primary knowledge reference. Confessedly, that is, we should have *two* objects on our hands, and so the problem of adjusting them —a problem which, as Professor Strong holds, constitutes the stumbling block to traditional forms of dualism. Nevertheless we find him continually himself adopting just this terminology. Thus he speaks of "the enormous variations of size which are observed in visual objects (*i. e.*, essences);" of the essence as the object without its existence; of the "object as an essence" being given in sense perception; of the possibility of an object being given which does not exist.[2]

In comparing such passages with the more explicit definition, I seem to myself to detect a mixture of two points of view which I can not see are identical, though Professor Strong apparently would think them so. The two are set alongside one another instructively in a passage in which he speaks of the essence as "a mere logical abstraction, a vision conjured up."[3] Now I am unable to feel the appropriateness of speaking of a logical abstraction as a vision conjured up. Logic has to do with conceptual reality, with characters rather than with things;[4] vision, on the contrary, suggests just the sort of concrete picture or replica which, since it need have no existence in the physical world, philosophers have found a home for in

[1] "The Origin of Consciousness," p. 35.

[2] Pp. 231, 175, 36, 41.

[3] P. 125.

[4] For a statement of the logical interpretation, *cf.* 176.

the realm of the mental. And in spite therefore of Professor Strong's repudiation of his own earlier distinction between phenomenal things which alone we directly perceive, and real things, or things in themselves,[5] he not infrequently reads very much as if the essence-object were just such a phenomenal thing. Nor is his constant assertion of the non-existence of the essence necessarily inconsistent with this. I have been unable to make quite certain also what is meant by this non-existence, for it might have either of two meanings, corresponding to the distinction just noted. If the essence is strictly logical, then its non-existence supposedly stands for the fact that it *is* a character or group of characters merely, taken as such in abstraction from existence; it is non-existent because its existence status is not attended to in apprehending it, and so is not a part of the apprehended content. But the non-existence of the essence might also mean, simply, that it is not the actually existent object itself; there need, indeed, be no physical reality anywhere of which it is a "ghost or vision." This last however would fail to carry any implication that it is not, *as* a vision, something in itself. A ghost must apparently have *some* reality, or it would not "be" at all; and in spite of ourselves therefore we are pointed back to the psychical. And it is this second interpretation indeed that is the apparent sense of Professor Strong's most explicit account of the matter. The essence, he says, has the same unreality that belongs to shadows; the material fact called a shadow is a piece of dark ground, but *as* a shadow it is the unreal counterpart of a thing.[6] But is the "unreal counterpart of a thing" any more than a piece of dark ground that simulates a thing, though it lacks other qualities necessary to make it the particular *sort* of thing it simulates? Surely it is unnatural to speak of a *logical* fact as a shadow, or as the "unreal counterpart of a thing." And Professor Strong is every now and then betrayed into language that implies some non-physical "existence" for the essence. He speaks of the case where something *appears* which is not real (*i. e.*, which is not the reality it appears to be?), and of the datum as the *effect* of a real object.[7] He speaks of the essence given and the object of which it purports to be the essence as mutually independent,[8] though two things have already been defined as "independent" when one can exist without the other.[9] It would perhaps be possible to avoid express contradiction by explaining that what is meant is not strictly the essence,

[5] P. 7.
[6] P. 180.
[7] Pp. 77, 73.
[8] P. 62.
[9] P. 42.

but the mental state that carries the essence; but at best the very tendency to slur over the distinction between the two after they have been so carefully separated—a tendency which is illustrated rather frequently in Professor Strong's pages[10]—is evidence that there is real difficulty is grasping the essence, considered as a vision, apart from a psychical embodiment. The same situation, verbally at least, is suggested by the account of the process through which the essence becomes more than an essence, and is affirmed of the existing object. When we are told that in sense perception we not only have an essence but assume it to exist, the wording seems to imply that what we do is to add existence to something already fully qualified as an object. But if it already is an object, it is not altogether easy to meet the claim that it is itself the original object of knowledge, in which case dualism has come back.

In other places I think I am able to interpret Professor Strong in a way to free him from anything except verbal contradiction, more particularly in certain passages—which might seem explicitly to be denying the view here maintained—where he argues at length that the "true data of sense perception are not qualities but qualified objects."[11] But here, if I do not misapprehend him, he is not thinking about the essence at all. When he maintains that physical things, not "sensibles," are the true data of experience, or that what is given in sense perception is the physical object,[12] he is apparently, in spite of his definition of "given" and of "datum," not referring to the essence—to which these terms alone apply—but to the real object itself. He is intending to maintain, that is, not that the physical object is originally given, but that it is *known* or *perceived*, as the fact to which the "whole state of mind and body is adjusted[13]—is not a mere logical construct from sensibles, as Mr. Russell would hold. But this involves not only essence, but affirmation; it is knowing, and not consciousness.[14]

Now a way out of these ambiguities seems to me to be available; it is to stick to the insight that the essence, or that which is given,

[10] *Cf.* p. 70.

[11] P. 105.

[12] P. 48.

[13] P. 46.

[14] This is not the only place in which Professor Strong fails to live up strictly to his own definition of "given." Thus twice within the three pages that immediately precede the formal list of definitions in which an object is defined as a real thing existing in one continuous time and space, and the essence as alone that which can be given, he has confused givenness with knowledge, and spoken of objects as given. ("The fact being that what is originally *given* or *known* is objects." "It will show us how these mental facts are involved even in the cognition of physical facts, when yet nothing is given or experienced except the latter.")

is not an object or picture or vision at all, but a logical schema pure and simple, a complex of abstract characters. The essence in knowledge is that which we *ascribe to* an object which is not as such experienced; and what we thus ascribe is no more a non-existent vision that it is a mental state. It is a "nature." It is necessary, in other words, to separate sharply the objectivity of an essence from its own given character, the former being a new fact which supervenes upon it. The essence as such is objective in the sense (1) that it is *not* subjective or mental (but rather logical), and (2) that it is in knowledge *used* to characterize an objective world; but it is not in itself individualized *as* an object. You can not, Professor Strong argues, see the existence of an object; you can only see the object and assume that it exists.[15] But what is the difference between this and his own discarded phenomenalism? To be sure you can not see the existence of an object; but neither can you *see* the *essence,* as Professor Strong here seems to assert. You do literally see the *object.* But that implies that the only thing you see is the *existing object,* and not that you have an object first and then add existence to it. Knowledge, in other words, of which seeing is an instance, involves *both* apprehension of something (essence) *and* affirmation, and until you have the two together you do not get anything describable as an object; so that to call the essence alone an object is misleading. If we recognize this we can always mean by the object the independent real, as Professor Strong's definition requires. And thus only, as I see it, do we get rid of a vicious "representationalism" in the sense in which Professor Strong defines the term. If by vision we mean the ghost of an object, then it is something seen, and we do not know directly; if on the other hand vision means only the *seeing,* then it is not itself the essence, but that which first must use the essence before we get any object at all.

And this appears to me not only to render a true account of the experienced fact, but to be the only way to meet satisfactorily the issues which neo-realism in particular has raised. In perception we do, it is clear, somehow seem to be in the direct presence of the object itself. And it seems plausible to interpret this as meaning that the real object is directly apprehended, or present bodily in experience; otherwise, we may be asked, are we not forced to say that what we call the object is only a subjective appearance, and so find ourselves in the toils of subjectivism? Now I gather that what is in Professor Strong's mind is this same sense of an actually experienced object which by opening our eyes we can see before us; only as on *his* showing this can not be the *real* object (since, for one thing, it may be present when no real object exists), it is translated

[15] P. 48.

into the essence-object. As I have already said, however, it appears to me that if we are to free the term appearance from any taint of a subjective existence, and be able to hold that we are, as we seem to be, in the immediate cognitive presence of the real object, it can only be by refusing to talk of any object at all as given, or immediately apprehended, even an object without existence. And Professor Strong has already shown the way. There are two separate aspects of the naïve sense of actual contact with the physical world, which need to be carefully distinguished. There is, first, the vividness which attaches to those qualities that perceptually qualify the object, and which, as Professor Strong has pointed out, does not need at all to conflict with the insight that the essence is itself abstract. A vividly apprehended quality is still a quality, and not a thing. But now this vividness does not itself constitute objectivity, as is shown by the fact that what is felt as non-objective—a pain for example—may be realized with equal or greater vividness. The sense of the presence of a "real object which has the quality" must be explained differently. And I think it is possible to do this, and to give a plausible account of the immediate feeling that the real thing *is there,* without supposing that its being there means that it is directly experienced, in the sense in which the being there of the quality is just its vivid presence in experience, or its direct apprehension. The object is there in the sense that we feel ourselves directly in a practical or motor relationship to it. The experience of the object's presence reduces, in so far as I can analyze it, to this tingling sense of *active tension,* of actual or potential adjustment, through which I realize myself as conditioned by, or dependent on, something which stands in active causal relationship to my body. The presence of the object is the presence of that which I instinctively recognize as able to affect my welfare as an organism; this ability to insure practical consequences *is* what I *mean* by a real thing; and the recognition is brought home to me by the tendency to muscular response which characterizes of necessity my dealings with my physical environment. Apart from this there would be no "things" in my experience, but only a variously toned field of sensuous feeling. And if objectivity is thus bound up with an experience that goes beyond immediate apprehension and reveals a world independently acting upon us, then whenever the thing-aspect of experience is involved we have, not essence and consciousness, but real existence and cognition.

As all our knowing starts from sense perception, it is not strange that in thought and memory and imagination, also, there should be reproduced, along with the group of characters, this same sense of objectivity in terms of which alone it is possible for our thinking to

deal with the real world. For it is surely so, as the neo-realists have done good service in reiterating, that we do not in thinking cognize images, but things; even when I think an imaginary object like a centaur, I am thinking a centaur, and not the image of a centaur. In thinking, it is true, I may image an object; but this very statement, if taken strictly, excludes alike the claim that the object is an image, and the claim that the essence is an object. The image is the medium *through* which I think the—independent—object. This experience I then can introspect, indeed, and recognize as involving some sort of substitute for the object, and not the actual presence, *as* an experience, of the object itself. But what I thus recognize is still not the essence; since the introspective act brings before the mind not the *characters* present in the perceptual experience simply, but likewise its objective reference as an affirmation or activity, this always possesses an "object" aspect which make it concrete and not abstract.[16] For surely to image a horse is different from thinking the concept or essence horse; I can do this last only by attending to the abstract features which describe a horse, and to this process any picture of the horse as an object is irrelevant. And this is the only basis on which I am able to see the possibility of escape from the perplexities of neo-realism. If we separate the two meanings of presence attaching to the two aspects of real existence and of content, we can accept the claim that the *content* is apprehended, without having to suppose that the existent (or non-existent) object itself is there; *its* presence is, in thought, only the reproduction of the sense of "being in the presence of" which we get from the motor experience in sense perception, though with that vivid feeling of compulsion lacking which there normally assures belief.

It is partly into terms of this same ambiguity that another point of difficulty which I feel with Professor Strong's formulation of his doctrine seems to resolve itself—namely, his account of the status, as distinct from the nature, of the essence in knowledge. He has himself isolated the problem as the problem of *how* a sensation or mental image can convey an essence.[17] To this question, however, he

[16] So long as I talk of an "image," it is always the image of something, and I can not get away from "objectivity." Consequently the pure fact of psychological analysis on the existential side is not an image concretely as this implies a "thing," but a group of sensations or reproduced sensations, among which the motor sensations involved in the recognition of objectivity take their place. There may be a certain grouping or cohesion among these, though even this measure of unity seems to be due to the unifying activity of the organism and its needs. But the mere coalescing of sensations does not yet constitute an "object," apart from the further reference to an active center of force beyond me.

[17] Pp. 111–2.

seems to me inclined to give two different answers; or rather he gives one answer, but every now and then suggests an alternative one. The explicit answer is: the essence is given through the function by which the sensation guides the organism in its adjustment to objects.[18] Thus a horse has the essence "a fearful object" if the visual sensation causes him to shy; and the cat is *ipso facto* aware, when a certain sensation in her mind evokes instinctive movements of crouching and watching.[19] That all we need for our analysis is the sensations called forth by the object, and the reaction or attitude to which they prompt,[20] is asserted more than once without qualification.

Now I can not at all feel, in the first place, that the reduction of cognition to a sensation plus a physical act is successful in meeting the full needs of the situation. We may indeed act upon the suggestion of a sensation; but the act is purely and simply physical, and as such lies outside the circle of the inner life of experience where knowing resides. It seems to me a plain matter of fact that we are aware through introspection of a situation quite distinguishable from this, to which we assign more naturally the name of knowledge; we are aware, that is, over and above the *de facto* physical response, of something describable as a conscious recognition *that* an object, felt to have a real and independent life of its own, is characterized by an immediately apprehended content. And of this persuasion Professor Strong's formulated theory gives no account at all. He does indeed provide a certain "experienced" element in the form of a "return wave" from the act of attention or adjustment, which gives a special coloring to the cognitive state;[21] but this at best explains only our sense of activity in knowing, and not at all the special features of cognition of its content side. And Professor Strong is himself constantly using language that goes beyond his own analysis. He speaks of "conjuring up" the essence, of its being "brought before the mind," of the symbolic use of the psychic state which "gives rise to a vision-of-the-object," of essences as "loopholes through which we truly contemplate" reality.[22] Surely such words as these imply more than a mere sequent fact of action. Or why speak of the given essence as "rendering the object truly,"[23] if all we mean is that the sensation (which is not the essence) produces an appropriate act?

The explanation seems to me to be that Professor Strong has in

[18] *Cf.* p. 103.
[19] Pp. 122, 137.
[20] P. 279.
[21] P. 137.
[22] Pp. 43, 87, 170, 235.
[23] P. 232.

mind two separate problems, which he does not sufficiently distinguish; and his more explicit doctrine has reference only to one of these, and that, for epistemology, the less fundamental one. It appears, namely, that when he talks of cognition, he intends by the term, when he is speaking strictly, only the *perceptual* experience to begin with,[24] and even this in a particular and narrow sense—the practical or biological sense, rather than the epistemological or contemplative one. In other words, cognition means to him that instinctive relationship in which we stand, in perception, to the physical world in terms of adjustment to the environment—a "function existing primarily for the sake of action."[25] This *is* the fundamental evolutionary meaning of perception. The animal, or primitive man, has no concern with the question whether the characters given in perception possess true ontological significance; what he is interested in solely is its practical service as a stimulus to response, in terms of a successful carrying out of the functions of life. And so far cognition falls within the lines of Professor Strong's theory. It is enough if the sensation serve as a mark or symbol for the guidance of action; and the truth of the cognitive process is sufficiently covered by the success of the act to which it leads. But it is necessary to note very clearly that the utility of sense experience for guiding action, and its adequacy for giving us a true account of the nature of things, or for serving as a "loophole through which we truly *contemplate* reality," are things quite distinguishable.

And now what I wish particularly to point out is that Professor Strong is able to justify his own answer to the question, How is the essence conveyed by a sensation? only by failing again to live up to his definition of the given. "Cognition, in fine," he writes, "is extremely simple; it is nothing but the givenness of an essence, and the acting in consequence as if an object existed."[26] The essence, it appears from this (and indeed from his definitions generally), must be given before the act can follow. But before the act there is nothing discoverable except the sensation, to whose nature the essence may be, Professor Strong holds, entirely foreign. It is to be remembered once more that Professor Strong professes to distinguish givenness, or consciousness, from cognition, and that only the latter brings the physical object itself into the situation; and he expressly contrasts his own theory with that of James as a theory of consciousness *versus* cognition.[27] But if givenness is a function

[24] *Cf.* especially p. 228.
[25] P. 7.
[26] P. 40.
[27] P. 130.

of the sensation in leading to an act, what is left as a description of what he intends by cognition? Is not in fact this act just the affirmation which Professor Strong *adds* to givenness in order to explain knowledge, and which he has defined as the "implication of acting as if the object existed"?[28] In other words, it looks to me very much as if, contrary to his main thesis, no real distinction is left between givenness and cognition, if we are to explain givenness by a functional act. We might indeed make givenness only the *potentiality*, as against the actuality, of knowing; but I do not see that this is a significant distinction. And we should at any rate still leave unanswered the problem which Professor Strong professes to be solving—*How* does the sensation convey the essence? Even granting that knowledge is sufficiently described as organic adjustment, the meaning of this question would still be, What particular feature in the psychic state makes possible the act of adjustment? and this is not answered by reasserting the fact. And still less, if knowledge possesses a genuine cognitive as *distinct* from a behavioristic value, is the givenness of the essence accounted for by anything short of an explanation of *how* a psychic state can give rise to the recognition, *prior* to action, of a definite cognitive content assumed to be a description of the object—a situation quite ignored when to a sensation we simply add an act.

Now Professor Strong seems to me to have the true answer to this question within his grasp, without however making any use of it in his explicit theory. In most cases, he writes, "we are justified in assuming that where an essence is given an object exists, and that it has the *character given in the essence.*"[29] Now this last phrase supposedly means, not that the sensation leads to successful action merely, but that the essence, as an essence, possesses a certain character which we believe attaches to reality. The claim of attachment to reality is what we have already called affirmation, and involves an act; but what constitutes the character given, or essence? The solution suggested more than once by Professor Strong himself is: identity of character between the sensation and the object, in so far as this is needed to justify cognitive claims.[30] Of course it may

[28] P. 111; *cf.* p. 48.

[29] P. 38.

[30] "In so far as a visual or tactile sensation, bearing in its own nature the impress of the object, causes the organism to react as if it were in the presence of that object, in so far the object is given as an essence" (122). "In the case of vision this sense organ is so constructed as to make the sensation a sort of duplicate or picture of the object" (129). "Something corresponding to [the qualities] must be assumed in the psychic state, in order to account for the awareness being *of* the qualities" (140). "With the development of sense organs objects become able to evoke within the organism impressions corresponding to if not actually resembling themselves" (172). Truth means "agreement with the portion of the environment pictured sufficient at least for the attainment of practical ends" (181).

still be said that *mere* identity here is not givenness. Nothing is given except as this given essence is also cognitively *used;* givenness is an aspect always of the larger knowledge situation. But *as* an aspect, the capacity for "conjuring up" a definite thought content, immediately apprehended, belongs not to affirmation or act, but to the psychic state in its own right, and the characters it is able to bring upon the scene. The difference which Professor Strong makes between knowing in perception an object, and knowing in thought a past experience (in which latter case he allows that the vehicle must be a mere copy or duplicate),[31] is thus not, as he tends to make it, a difference in kind. True "contemplative" knowledge *always* involves such a copy (or identity of character); and sense perception differs from thought only in the degree in which critical reflection may throw doubt upon the full adequacy of its profession to convey, on its qualitative side, a correct description of the real world. Meanwhile for the other and psychological question, which is interested solely in the mechanism through which a sensation or image may serve as an effective cue to conduct, the whole essence concept is irrelevant; sensation plus instinct is all that we need.

A. K. Rogers.

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TESTS OF TRUTH

THE ancient faith that somewhere, in some form, there is such a thing as a universal criterion, a kind of philosopher's stone, the bare touch of which is sufficient to distinguish the pure gold of truth from all baser metals, is still with us, and in many disguises is strongly entrenched in modern logic and epistemology. The *dictum de omni et nullo*—that famous principle of syllogistic reasoning—still serves to separate the valid from the fallacious. The *Principle of Identity* and the *Law of Contradiction* are still invoked in the same cause, and we still have in our midst a band of true believers in the might of *Direct Intuition, Coherence, Correspondence,* and the *Inconceivability of the Opposite.* In short, wherever we have a theory of knowledge, we tend to have, among the characteristics by which it is defined or made determinate, certain attributes which come to be regarded by the faithful as infallible criteria of truth.

The object of the present paper is not to enter upon a detailed discussion of the manifold forms in which this absolutistic faith still wins its proselytes, but rather to examine the general idea which

[31] P. 113.

gives to such a faith its meaning, to find out what can be said in its favor, to see how far, if at all, it can be of use in the discovery and organization of empirical truths, and to see where—and if possible how and why—it breaks down in practise.

I

With this aim, we shall begin by considering an instance of the actual pursuit of truth in the concrete, in the field of natural science. We have before us a dish containing a fluid which is either an acid or an alkali. We have also red and blue litmus paper. Can we, by any manipulation of universal criteria, discover whether the fluid is acid or alkali—or are we not rather compelled to apply the specific tests of experiment and observation? In seeking truth within the sphere of sensory experience, our methods of discovery, and the concrete tests which we actually employ, appear to be empirical, and to vary according to the concrete problems with which we are faced. There does not appear to be any place, in the attempt to discover concrete answers to concrete questions, for the application of any *universal* test. No doubt it is true that we are in some sense presupposing the laws of identity and contradiction, the principle of coherence, and the rest. But these principles are too general, and too remote from the concrete problem, to afford us much assistance when it comes to detailed investigation. The laws of identity and contradiction, for instance, inform us that the solution of the problem is what it is, and is not what it is not. The principle of coherence tells us that our solution will cohere with the vast body of ascertained truth in a single system. The principle of correspondence tells us that our conclusion, if true, will correspond to the facts, *etc.* But no one, and no combination, of such principles will ever inform us whether the fluid before us actually is or is not acid. In fact, these principles plainly refer rather to the organization of elements of knowledge which we have obtained elsewhere—from sense-experience. They do not seem able to increase the bounds of knowledge, but only to organize it.

They are not, however, to be regarded as entirely useless, even in the discovery of concrete answers to concrete questions. In organizing elements of knowledge obtained from sense-perception, we may, perhaps, by adopting new viewpoints and effecting novel combinations, arrive at answers which are concrete and yet are independent of further sense-experience. Every member of the congregation is desirous of discovering the age of the new minister. In the course of a sermon he happens to mention that he took part in the Spanish-American war, and in some special reference happens to state that he was only eighteen at the time. By putting together

these two items of information and comparing them with the present date, every member of the congregation at once deduces his present age, and the concrete problem has received a concrete solution. Has not this result, it might be asked, been effected by applying the general principle of coherence?

Let us consider. The actual discovery is made by subtracting 1898 from 1919, and then adding the answer (21) to 18, which gives us 39 as his present age. That is to say, the answer is discovered by subtraction and addition—operations somewhat more specific than "coherence." And not only so, but by subtracting *1898* from *1919*, and by adding the answer to *18*—*i. e.*, by very specific addition and subtraction. If we were acquainted with the general principle of coherence, but did not know how to add and subtract, the problem could not be solved. And even if we were acquainted with the general types of mathematical operation, unless we also knew that we were to subtract specific numbers, and add specific numbers, the concrete question would continue to remain without a concrete solution. It looks, then, as though, even when we restrict ourselves to the *organization* of knowledge, the principles which we actually *use* are specific, and contain elements which are empirical, and vary from one concrete problem to another.

So far, then, as the *discovery* of concrete truths is concerned, these general criteria are of little or no assistance. But, it may be urged, their proper use is other than this. Given some discovery, derived, it may be, from sensory experience, these principles may be applied to *test* the discovery, to find out whether it is valid or not, whether it corresponds to fact, whether it is consistent with the whole body of ascertained truth, *etc.* Their proper use is thus, not originative, but critical. They do not tell us exactly what is true, but they do help to discover what must be rejected as false, *i. e.*, as inconsistent, or not corresponding to fact, *etc.* Dialectic, then, or the science of these rules, is the *scientia scientiarum*, the universal science which sits in judgment upon the concrete "laws" proposed for general acceptance within the departmental sciences, and decides upon their consistency or inconsistency, their correspondence or non-correspondence to fact.

Good. The office of the dialectician, then, resembles the office of the book-reviewer. It requires omniscience. The reviewer must know what the facts are, before he can judge whether the suggested formula states them correctly or incorrectly. So too with the dialectician. He must know more than the departmental scientist. On the one hand, he must have a profounder viewpoint and a wider logic, and on the other, in order to apply his general touchstone to the concrete problems, he must know more than the special scientist

within his special field. He must know what the special facts are, which the scientist does not know, but is seeking to formulate. This knowledge is a *sine qua non,* whatever the criterion selected. It is as true of "coherence" as of "correspondence." To know that a given proposition is coherent with the whole body of ascertained truth, it is necessary to know, not only the given proposition, but also the whole body of ascertained truth—*i. e.,* to have at least the special knowledge of the scientist. But in order to sit in judgment upon his work and decide whether it is consistent with some higher viewpoint, it is necessary to have still further knowledge; and to decide absolutely without appeal whether it is consistent or inconsistent, true or false, it is necessary to have knowledge of the ideal system of completely consistent knowledge—*i. e.,* to have omniscience.

In order, then, to apply these criteria as universal tests of any and every concrete formulation of fact which sets up for a truth, we must have omniscience. This is, in itself, a fatal objection to the use of these general formulæ as *tests.* For, if we were not in possession of the truth, we could not apply these tests in any given case; and if, on the other hand, we were already in possession of the truth, in that case we should not require the roundabout and empirical method of trial and error which the departmental scientists use. At best, the use of such standards would be secondary, in order to inform others *ex cathedra* by how much their approximations to truth fell short of the complete knowledge which was in our own possession; and if certain members of the human race were actually in possession of this complete knowledge, they would publish what they knew, and the empirical methods of the scientist would fall into desuetude.

Again, as in discovering truth, so in testing it, it would not be the *general* criterion which would be applied, but always something more *specific.* To test the correctness of the proposition, *This liquid is acid,* we do not ask, "Does it correspond with the facts—is it coherent—is the opposite inconceivable?" We take a piece of blue litmus paper, dip it in, and see whether it turns red or not. The test *used* is concrete and specific. So too, when told that the minister's age must be 39, because he took part in the Spanish-American war at the age of 18, we test the truth of this statement by going through the appropriate numerical calculations. In actual practise, then, the general or universal criteria do not seem to be used.

There exists a further argument, of a more abstract and dialectical character, which proves, not only that the principles of coherence, contradiction, *etc.,* are useless in testing truths, but that no universal criterion whatever could be of the slightest use. The argument is as follows: Let x be any universal criterion of truth—

i. e., the law to which any and every statement which is to be recognized as true must conform. Let A be any proposition whatever, the truth of which is to be tested. Then, if A conforms to x, A is, by definition, "true." But a further question may be raised: How do we know that our application of x to A is itself correct? We must apply the test, and thus reach the conclusion, "The proposition A *conforms to* x itself conforms to x." But about this test of the application of the test to A, the same question can again be asked, and we are thus led, and led inevitably, to the infinite regress.

What are we to conclude from this? To make a judgment, we reflect upon sensory experience. To *test* that judgment, we reflect upon that reflection. To test that further reflection, we reflect further, *etc.* We must conclude that the "further" reflections carry us no further. What we really *do* is to reconsider the evidence, to go over the ground again, and repeat the experiment. If our repetition leads us to a different conclusion, we believe that we simply did not *think* the first time. If, however, on going over the evidence, we come to the same conclusion, we regard that conclusion as, so far, established. The test of truth, then, which is actually applied in practise, seems to consist in *repeating the specific experiment*, or in having others repeat it, so as to confirm our results—and not in applying any general or universal test such as coherence, correspondence, *etc.*

Finally, however, we must note that there is no virtue in repetition as such. If we can not be certain of a proposition the first time we make a judgment, will one, two, three, four, n repetitions give us the required certainty?—The idea is, on the face of it, preposterous. Repetition is clearly an external device, a caution to ensure that we really think, really reflect upon the concrete situation with which we start, omit nothing, neglect no circumstance that is relevant. As a rule, it is the imperative, Be thorough! It bids us, when we reflect upon our concrete problem, really to reflect, and not to leap to conclusions. Such an imperative, however, is no *test* of truth. For a test, in order to be used as a test, must be different from what is tested—*e. g.*, as blue litmus paper is different from acid. But in this case, the "test" actually employed by the scientist is not different from the original experience in all its concreteness. They fall together. The concrete "test" of a concrete scientific proposition, then, is nothing more or less than all the evidence upon which the proposition rests. This will plainly differ from one problem to another, and will be empirical, concrete, and particular. Expressed in terms of the symbolism suggested above, either x is different from A—as a universal test differs from a particular proposition—in which

case we fall into the infinite regress, and can never apply our test to the particular proposition; or x and A coincide—in which case we are left with particular truths, each with its own concrete experience as its guarantee, but without any *universal* criterion. Our conclusion thus is, that to apply any universal criterion to any concrete proposition requires omniscience, and that short of omniscience it can not be done. We fall into the infinite regress in the attempt; for "Truth" is infinitely distant. There is a gap between absolute Truth, on the one hand, with its universal and necessary criteria *a priori,* and on the other hand the concrete truths, with which human experience, and the specific sciences gradually built up on the basis of that experience, are concerned. Each specific science has its own specific tests—the concrete evidence upon which its (empirical) laws are based. But from a human point of view we have only the departmental sciences, the specific problems, each with its specific evidence. There is, from this viewpoint, no *scientia scientiarum,* no universal science of dialectic applying its *a priori* tests of Truth to the loose and uncertain approximations of empirical science.

II

In the above, what is our position? We have drawn a sharp distinction between the absolute and the empirical, between dialectic and science, and have argued that the gap between these can not be bridged by any amount of human speculation which starts from the more metaphysical side. It looks as though we have duly noted the existence of a state of war between science and the forces of transcendentalism, and have definitely associated ourselves with the forces upon the side of science. What, it might well be asked, is our position but that of the Pragmatist, throwing yet another stone at the now discredited bugaboo, absolute idealism?

This impression, natural as it might seem, is too hasty. We have pointed out that, in spite of the distinction between our more metaphysical and our more empirical thinking, there are, in the camp of the idealists, many weaker brethren, whose faithfulness—*i. e.,* uncritical acceptance of illegitimate consequences of the idealistic position—leads them to attach to certain attributes of knowledge in the idealistic theory a value which these attributes do not possess. Our conclusion is that such attributes can not be used as universal tests of concrete truths. The gap remains, and can not be bridged as the faithful, but uncritical, brethren believe. This reasoning is directed only against the *un*critical idealist, the tender-minded brother who seeks in absolutism a refuge from the storm and stress of empirical problems, and from the viewpoint of a romantic idealism of the imag-

ination condemns the unromantic but very necessary work of the practical scientist.

Not all idealists, however, are thus to be lumped together as "tender-minded" refugees from the world of work-a-day wrestling with the obstinate problems of concrete life and science. There is an idealism of the will as well as an idealism of the imagination. There is a critical, as well as an uncritical idealism. It is perhaps only fair that we should set forth, in brief outline, the theory which remains untouched by our criticisms.

For the theory of critical idealism, there exists a gap between empirical truths on the one hand, and metaphysical Truth on the other, and it is considered hopeless to attempt to bridge this gap from the more metaphysical side. It remains, however, to attempt to bridge the gulf from the more *empirical* side, acquiring ever more and more scientific observations, and organizing these more and more, so that in time our empirical knowledge will gradually approach more nearly the ideal of knowledge organized into a single perfect system. The use of the concept of a more perfect knowledge is not as an absolute test for the discrediting of empirical formulations in favor of some mystical contemplation, but as a practical vision which shall definitely encourage and guide our steps. It is a stimulus to renewed effort, and consists in a consciousness of the development of science into better science. There is nothing about it which can be regarded as "absolute." It arises from reflection upon the progress of science in the past. This leads to an ideal continuation of the curve of scientific progress into the not-too-distant future, and thus gives us a standard which is not static, fixed, and absolute, but develops with the advance of scientific knowledge, beckoning us always further forward, towards a better, finer, truer, more scientific knowledge. The uncritical idealistic viewpoint gives us a static Superlative—infinite, absolute, unimprovable Truth—utterly removed from human concerns, and so far above human aims that it remains an object for ecstatic contemplation only, divorced from action. The critical viewpoint gives us no Superlative, but a Comparative, firmly based upon human experience in the past, and pointing towards its gradual realization in every step forward which knowledge takes in the present and not-too-remote future. For the critical idealist, the ideal of truth is a not-too-remote vision which guides and stimulates us in its quest—a quest continuous with present scientific advance. The tests of concrete truths remain empirical, scientific, and human—pointing, however, always a little beyond what has actually been attained. As to an absolute or universal criterion of Truth, however, from this standpoint there is no such thing.

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REVIEWS AND ABSTRACTS OF LITERATURE

A Survey of Symbolic Logic. C. I. Lewis. Berkeley: University of California Press. 1918. Pp. iv + 406.

This work, which appeared among the Semi-centennial Publications of the University of California, fills an important hiatus in the literature of logistics and mathematical logic. These studies are of so recent an origin that there has been till now no opportunity to consolidate into a single treatise anything but their most simple and primitive aspects. Accordingly the student, after leaving the almost childishly simple Boolean algebra as presented in the writings of Couturat and del Ré, is immediately confronted with that forbidding monument of patience and research, the *Principia Mathematica* of Whitehead and Russell. He encounters an unfamiliar symbolism, new methods, and a most exacting standard of rigor. It is only after he has become proficient in this new field that he can discern the fundamental unity underlying the investigations of Boole, De Morgan, Peirce, and Schröder, on the one hand, and those of Frege, Whitehead, and Russell, on the other.

Professor Lewis has written a work that completely bridges over the gap between the old and the new. He treats the history of symbolic logic in an impartial and comprehensive way, slighting neither the founders of the classical theory nor the principal innovators of the present day. After a good résumé of the classical theory of equations and inequations, he proceeds to a parallel development of the foundations of the logic of propositions, propositional functions, and classes on the Boole-Peirce-Schröder basis and on that of the *Principia*, exhibiting both the formal identity of the two systems and the inadequacy of Peirce's enumerative method of defining universal and particular propositions in terms respectively of iterated logical multiplication and iterated logical addition. There is a mass of excellent detail work in this connection, so that this part of the book should prove useful as a glossary for those who desire to transfer statements from the Peirce symbolism to that of Russell and *vice versa*.

Chapter V is devoted to Professor Lewis's personal contribution to the subject—the calculus of strict implication. This valuable piece of work is here for the first time gathered together in a unified and definitive presentation. It unquestionably constitutes a legitimate alternative to the "material implication" of the earlier writers, but the reviewer does not consider that it has been definitely established that "strict implication" is not simply formal implication between propositional functions whose variability is suppressed.

The last chapter concerns the relations between logistic and

mathematics. The Russellian view is fairly expounded, but the author also develops a "heterodox" standpoint, from which both logistic and mathematics become a manipulation of symbols by a method of substitution whose laws can never be stated exhaustively in a symbolic form. This constitutes a perfectly just criticism of the part played by non-symbolic postulates in the *Principia*. Lewis is quite right in pointing out that the postulates of the *Principia* differ from other postulates in degree rather than in kind.

Among other things, Lewis contrasts the encyclopedic logistic of Peano, the deductive logistic of Russell, and the synthetic logistic of Royce, in which many types of order are obtained by the specification of a more general, inclusive order. A notion not introduced by Lewis, but worthy of comment in this connection, is that of categoricity with reference to a particular set of concepts, introduced into mathematics by R. L. Moore. Moore has pointed out that a non-categorical set of postulates may still completely determine the formal properties of some notion that may be obtained from the undefined terms. A set of very few postulates—even a set of no postulates at all—may thus determine a number of completely specified notions, if used in conjunction with the appropriate definitions. It is hence possible to build up a theory of order—that is, a logistic—based primarily or even exclusively on definitions instead of on postulates. This, I imagine, is more or less what the Royce logistic proposes, and what Mr. Lewis considers a promising alternative to more developed methods.

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The Field of Philosophy. JOSEPH ALEXANDER LEIGHTON. Second revised and enlarged edition. Columbus: R. G. Adams and Company. 1919. Pp. 475.

To write a satisfactory Introduction to Philosophy is no mean task. Those who have tried it will, I am sure, agree with me in this statement. Especially is it difficult in this period of the renewal of philosophy, when there is such an apparent diversity of opinion, when philosophy is like a vine full of sap sending tendrils in every direction.

There are two ways of approach to the study of philosophy, the historical and the analytic. I do not mean to assert that one of these ways must exclude the other, but only that one of them must dominate. Professor Leighton realizes that "the History of Philosophy should be a second course." Yet he is also aware that "a purely topical and systematic introduction fails to bring the student in contact with the great historical doctrines in other than the scrap-

piest fashion." Hence his own method is an attempt to combine the two ways of approach. The only difference of opinion of any value can, I believe, concern the blending of these two elements. Is there enough unity? Are typical philosophical problems brought out clearly before the attention of the student?

The Field of Philosophy falls into two parts: The Chief Problems and Standpoints of Greek and Medieval Philosophy, and The Chief Problems and Standpoints of Modern Philosophy. When one examines the chapter-headings, one soon sees that practically all the topics which have arisen in the history of philosophy are touched upon. The book is systematic and, for an introductory text, decidedly exhaustive. The references at the end of each chapter will enable the enterprising student to supplement the summaries given in the text. There is thus a plenitude of material. My only fear would be that some of the students would be overwhelmed by the detail of the treatment. Since Professor Leighton has worked out his text in the class-room, I suppose that my fear is groundless.

The historical side of *The Field of Philosophy* is admirably done. I do not think that any one who used this text would find many points of interpretation to differ upon. I have, for instance, found his treatment of Primitive Thought in Chapter II. especially well worth while. Assuredly, more of our students should know what the primitive view of the world was and how much of this natural, early outlook still lingers with us.

I presume that it is in the systematic part of an Introduction that the particular view of the writer is bound to come to the front. How far should an Introduction be a presentation of various standpoints? To what degree should it stress one beyond others? This is the crux of the problems. Professor Leighton evidently tries to be fair to all points of view, but—and I think very rightly—indicates his own outlook, a modified form of objective idealism.

In his epistemology, he champions what he calls Critical Realism. Of course, a term in philosophy seldom has a fixed meaning. Yet I have so completely identified my own outlook with this term that I was interested in discovering what Professor Leighton meant by it. "It may be objected to this view that what we mean by a real thing is the thing as it exists independently of our perceptions. To this I reply, yes and no! Independent of *my* perceiving it, yes! But no meaning can be attached to the idea of an object existing independently of *anybody's* perceiving it" (p. 356). To me, at least, this is nearer idealism than realism. Yet we have in Leighton's book, as in those of Pringle-Pattison and Mackenzie and others of the idealistic tradition, a swing toward realism and a desire to get away from any taint of Berkeleian subjectivism.

The mind-body problem is to the average student quite strategic in its importance. I have found the author's presentation of his own view interesting. So far as I can grasp it, I find it analogous to Leibniz's solution. There are three grades of individua: (*a*) Inorganic or Physical Individua; (*b*) Vital Individua or Monads; and (*c*) Mental Individua or Selves. I am not clear in my mind whether he thinks of these three grades as levels of evolution or flat differences in kind.

The last few chapters are devoted to an exposition of the various philosophical disciplines. The chapter on The Philosophy of History is very good. So are the treatments of Psychology, Logic and Social Philosophy. There is, perhaps, a little more exhortation in the discussion of Philosophy of Religion than suits the naturalist's taste. The appendix contains a study of contemporary movements in philosophy. In this he shows scholarship and acuteness.

There will, I think, be general agreement that Professor Leighton has produced a high-grade piece of work. If it is just a trifle ponderous at times, it makes up for this by completeness and scholarship. He is quite evidently a genuine philosopher who has thought things out for himself.

ROY WOOD SELLARS.

UNIVERSITY OF MICHIGAN.

JOURNALS AND NEW BOOKS

REVUE PHILOSOPHIQUE. March-April, 1919. *La psychologie, ses divers objets et ses méthodes* (pp. 177–221): A. LALANDE. – A historical sketch, followed by a résumé of positions on the subject of the province, objects, and methods of psychology. *Esthétique et mémoire. Du rôle de la mémoire dans la perception du Beau réalisé par l'Art* (pp. 222–250): E. D'EICHTHAL. – The rôle of memory is "the establishment in time or space of a solidarity of elements which contribute, by their connections, to the impression of a whole that satisfies completely our sense of perception. From this establishment grows the feeling of a result which constitutes esthetic realization . . . whatever may be its limits and particular forms, the enjoyment of the beautiful does not exist without the preliminary work of memory, which reunites and solidifies the elements while organizing them into an image of a whole endowed with a certain persistence, first on the part of the creative artist, and then on the part of auditor on spectator." *La dynamique cérébral* (pp. 251–269): GEORGES BOHN. – An exposition of Bohn's law of reciprocal phenomena: "When an action produces on a body in

equilibrium a modification of condition, this is accompanied, under very general conditions, by a secondary phenomenon, called the *reciprocal phenomenon,* which reacts on the initial action; the nature of the reciprocal phenomenon is always such that it tends to oppose itself to the continuation of the modification produced." The law is applied to cerebral phenomena. *L'X objectif conscient* (pp. 270–318): PAUL DUPONT.–"By means of objective psychology we apprehend that the given, the phenomenon, appearance, is an event in an element of material objectivity, and as objective, is a function of events in other parts of the objective. Whatever the phenomenon, it is for the subject as a fact of conscience, the contrary of a phenomenon, since the latter does not appear to him who observes the concomitant phenomenon in the brain of the subject. The spiritualists think that in man at least the objective x decomposes into two x's, distinct, and independent." . . . No argument of scientific value can settle this problem that breaks out as a result. "The fact of consciousness is the establishment in and by certain objective 'x's of a particular kind of certain of their variations, functions of the other 'x.' The objective of which we are conscious is then in the class of the first 'x's. It is certain that each of them comprises, as an essential constitutive element, the objective x, which has for its phenomenal manifestation the organized body or one of its parts, the brain. It is not possible to affirm scientifically that there is not in man another constitutive element, destitute of phenomenal manifestation, but nothing that we have so far seen indicates its existence." *Notes et Documents. Notes sur la mémoire:* LUCIEN ARRÉAT. *Analyses et Comptes rendus.* José Ingenieros, *Proposiciones relativas al Porvenir de la Filosofia:* J. PÉRÈS. Giuseppe Saitta, *Il Pensiero di Vincenzo Gioberti:* J. PÉRÈS. Frederick J. Teggart, *The Processes of History:* LUCIEN ARRÉAT. *Revue des Périodiques.*

Briffault, Robert. The Making of Humanity. London: George Allen & Unwin. New York: Macmillan Co. 1919. Pp. 371.

Macintosh, Douglas Clyde. Theology as an Empirical Science. New York: Macmillan Co. 1919. Pp. xvi + 270. $2.

Partridge, G. E. The Psychology of Nations: A Contribution to the Philosophy of History. New York: Macmillan Co. 1919. Pp. x + 333. $2.50.

NOTES AND NEWS

The National Research Council has sent us the following news item:

"DR. W. V. BINGHAM, Head of the Division of Applied Psychology of the Carnegie Institute of Technology at Pittsburgh, has been

appointed Chairman of the Division of Anthropology and Psychology of the National Research Council. Dr. Bingham is an authority on methods for measuring the intelligence of normal adults. Early in the war, as Secretary of the Committee on Classification of Personnel of the Army, Dr. Bingham applied these methods to testing the mental capacity and fitness of recruits as a basis for assignment and training for particular military duties, and later continued this work as Lieutenant-Colonel in the Personnel Branch of the General Staff.

"At present Dr. Bingham is connected with several bureaus of the Carnegie Institute, which are engaged in studying the application of these principles in commercial and industrial occupations. One of these bureaus, that of Personnel Research, is supported by annual contributions from 30 corporations. This bureau is engaged in ascertaining the best methods for selecting and developing executives, salesmen, and clerks. Another bureau is applying the same principles in developing methods for selecting and thoroughly training workers in about 900 positions in seven of the leading department stores of Pittsburgh. These stores contribute $32,000 annually for these investigations. The financial support given this work of investigating and applying scientific mental tests reveals the confidence which is being placed by corporations and store executives in the money value of a rational study of their employment problems."

The other members of the Division of Anthropology and Psychology, besides Dr. Bingham, are as follows:

Representatives of Societies

AMERICAN ANTHROPOLOGICAL ASSOCIATION

FRANZ BOAS, Professor of Anthropology, Columbia University, New York City.

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